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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Yair Ein-Eli

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11/04/2009

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EXAMINER

PARVINI, PEGAH

ART UNIT

PAPER NUMBER

1793

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DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/551,714	<b>Applicant(s)</b> EIN-ELI ET AL.	
	<b>Examiner</b> PEGAH PARVINI	<b>Art Unit</b> 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 23 July 2009.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-22 and 26-54 is/are pending in the application.
- 4a) Of the above claim(s) 31-52 and 54 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22, 26-30 and 53 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/2/2009</u> .  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Election/Restrictions***

Amended **claims 31-36** are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons:

Claims 31-36 are drawn to a method of forming a passivating layer on a surface grouped under Group IV. The inventions listed as Group I, II, III and IV (Groups I, II and III had been addressed in the Election Restriction mailed out on 12/5/2008) do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: The special technical feature which is a composition used to form a passivation layer on a substrate, such as copper or copper alloy substrates, in which the composition has a pH of preferably between 2 to 12 and not having film-forming agent is taught by U.S. Patent No. 6,447,371. It is to be noted that the use of film-forming agent in first slurry of said reference is optional, therefore, can be considered to read on the limitation of instant claims specially considering the fact that instant claim 1 recites "and being devoid of a film-forming agent, a copper complexing agent and/or ammonium cations".

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 31-36 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

### ***Information Disclosure Statement***

With reference to the IDS submitted on 6/2/2009, cite#1, 2, and 3 were crossed out and not considered because:

(1) cite#1 (i.e. "IPRP") believed to be the same as cite#3 was a blank page with no information provided,

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(2) cite#2 (i.e. "SR+WO") is assumed to be referring to International Search Report which is submitted as cite#4; further, it is not as what Applicants is trying to submit by stating "WO",

(3) finally, cite#3, as pointed above, is only a page (i.e. Form PCT/IB/326) with no information.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 1-12, 26-30, and 53** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,447,371 to Brusic Kaufman et al. alone or in view of U.S. Patent No. 6,589,099 to Haggart, Jr. et al.

Regarding claim 1, Brusic Kaufman et al. teach a first and a second CMP slurries, wherein the first CMP slurry, having a pH of from about 2.0 to about 12.0, comprises an oxidizing agent such as hydrogen peroxide, or a permanganate, etc., an abrasive such as silica, alumina, or others in an amount of 0.5 to 15.0 wt% (column 3, lines 44-51; column 5, lines 17-33; column 7, lines 15-21; column 9, lines 29-38) wherein said slurry forms a passivation layer on the substrate (column 5, lines 55-56). It

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is to be noted that the reference, also, discloses applying said slurry onto substrates such as copper substrates to oxidize the copper to copper oxide (column 4, lines 24-27, 50-53, and 60-67). The reference discloses overlapping ranges of amount of abrasive and pH of the slurry with the ones instantly claimed, and overlapping ranges have been held to establish *prima facie* obviousness. See MPEP § 2144.05.

Although the reference discloses the use of complexing agents in the slurry, it does not disclose the use of copper complexing agents. Furthermore, considering the recitation of instant claim 1 which recites “being devoid of a film-forming agent, a copper complexing agent and/or ammonium cations” would make it clear that the teaching of instant reference on the optional presence of film-forming agent (column 6, lines 26-27 and 39-40) would read on the limitation of instant claims.

With reference to the limitations drawn to oxidation potential of the slurry, it should be noted that the reference discloses a CMP slurry having an overlapping range of pH containing similar abrasives and oxidizers used for polishing copper substrate by forming a passivation layer onto said substrate; therefore, the oxidation potentials as recited in claim 1 is seen a characteristic naturally following from the composition of the disclosed slurry of Brusic Kaufman et al. absence clear and specific evidence showing why said reference composition does not have or could not impart an oxidation potential which would meet the limitation of claim 1. In the alternative, it would have been obvious to one of ordinary skill in the art through routine experimentation in the art in order to optimize the oxidation potential based on the intended polishing rate since a

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reduction in oxidation potential would slow down the polishing rate as is known in the art as depicted by Haggart et al. in column 3, lines 36-40.

With reference to the composition being devoid of ammonium, it is noted that instant claim 1 recites "being devoid of a film-forming agent, a copper complexing agent and/or ammonium cations", thus, meaning that the composition need to be devoid of only either of the indicated ingredient/component. Considering the fact that the reference makes it clear that the existence of film-forming agents is optional, said limitation is assumed to be met absence proving to the contrary. This is specially true because once a component is optional, it does not have to be present in the composition. In the alternative, even though the reference may disclose the use of surfactant such as sulfate ammonium salts, or the use of pH adjusters such as ammonium hydroxides or the use of oxidizing agents such as ammonium cerium nitrate, they are all embodiments of the present reference which means that none of them are components that must be present in the disclosed CMP slurry.

With reference to copper and copper oxide not being soluble in the slurry as that recited in claim 1, it is to be noted that it's the examiner's position that copper and copper oxide are not soluble in the CMP slurry of Brusic Kaufman et al. since said reference does not disclose any solubility of copper or copper oxide in any of the disclosed CMP slurries.

Regarding claims 26-30, Brusic Kaufman et al. disclose the use of abrasive such as silica, alumina, or others in an amount of 0.5 to 15.0 wt% (column 9, lines 29-38).

Regarding claims 2-6, with reference to the substrate or the surface to be polished to include more than about 5%, 10%, 40%, 50%, or 80% of copper by weight, it is to be noted that Brusic Kaufman et al. teach that the first CMP slurry, as detailed out above, is used to polish a copper containing substrate and to oxidize the copper to copper oxide (column 4, lines 24-27 and 60-67); thus, since the reference is silent to the presence of any other component other than copper in the copper containing substrate, it is the examiner's position that said substrate contains, to a large extent, of copper, and therefore, the reference is taken to read on instant limitation absence clear evidence showing that said reference does not contain more than about 5%, 10%, 40%, 50%, or 80% of copper.

Regarding claims 7-12 and 53, with reference to the limitations drawn to oxidation potential of the slurry, it should be noted that the reference discloses a CMP slurry having an overlapping range of pH containing similar abrasives and oxidizers used for polishing copper substrate by forming a passivation layer onto said substrate; therefore, the oxidation potentials as recited in claims 2-7 is seen a characteristic naturally following from the composition of the disclosed slurry of Brusic Kaufman et al. absence clear and specific evidence showing why said reference composition does not have or could not impart an oxidation potential which would meet the limitation of claim 1. In the alternative, it would have been obvious to one of ordinary skill in the art through routine experimentation in the art in order to optimize the oxidation potential

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based on the intended polishing rate since a reduction in oxidation potential would slow down the polishing rate as is known in the art as depicted by Haggart et al. in column 3, lines 36-40.

Additionally, Brusic Kaufman et al. teach a pH of 2 to 12 for the first slurry as detailed out above.

**Claims 13-17 and 19-20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Brusic Kaufman et al. alone or in view of Haggart, Jr. et al. as applied to claim 1 above, and further in view of U.S. Patent Application Publication No. 2002/0017064 to Shimazu et al.

Brusic Kaufman et al. alone or in view of Haggart, Jr. et al. disclose a CMP slurry having a pH of from about 2.0 to about 12.0, oxidizers such as permanganates, abrasives such as silica and alumina as detailed above.

Although Brusic Kaufman et al. disclose the use of pH adjusters such as bases to adjust the pH, said reference does not expressly disclose that said base may be potassium carbonate.

However, it would have been obvious to one of ordinary skill in the art to modify the polishing composition to have included a pH adjuster such as potassium carbonate to control the rate of polishing copper substrate since bases such as potassium carbonate affects the rate of polishing copper by adjusting pH as that taught by Shimazu et al. ([0024]). Further motivation would be the fact that Brusic Kaufman et al.

suggest the use of pH adjusters. It would have been obvious that the two references are drawn to the same filed of endeavor.

**Claim 18** is rejected under 35 U.S.C. 103(a) as being unpatentable over Brusic Kaufman et al. alone or in view of Haggart, Jr. et al. and in further view of Shimazu et al. as applied to claims 1 and 13 above, and further in view of U.S. Patent Application Publication No. 2003/0212283 to Parker et al.

Brusic Kaufman et al. as evidenced by Haggart et al. and in further view of Shimazu et al. disclose a CMP slurry having a pH of from about 2.0 to about 12.0, oxidizers such as permanganates, abrasives such as silica and alumina as detailed above.

Even though the references as combined may not expressly disclose the use of cesium carbonate to adjust pH, the use of such compound to adjust pH would have been within the scope of a skilled artisan motivated by the fact that cesium carbonate is also a known alkali metal compound utilized in adjusting pH as that shown by Parker et al. ([0026]); furthermore, Parker et al. teach the use of other compounds such as potassium carbonate in order to adjust pH in a solution, thus, suggesting that potassium carbonate and cesium carbonate are functionally equivalent. It is well settled that the substitution of one functionally equivalent compound for the other is well within the scope of the skilled artisan absent clear evidence showing the contrary.

**Claims 21 and 22** are rejected under 35 U.S.C. 103(a) as being unpatentable over Brusic Kaufman et al. alone or in view of Haggart, Jr. et al. as applied to claim 1 above, and further in view of U.S. Patent No. 5,897,375 to Watts et al.

Brusic Kaufman et al. as evidenced by Haggart et al. disclose a CMP slurry having a pH of from about 2.0 to about 12.0, oxidizers such as permanganates, abrasives such as silica and alumina as detailed above.

Although Brusic Kaufman et al. as evidenced by Haggart et al. disclose the use of permanganates oxidizers, they do not expressly disclose the use of an oxidizer such as potassium permanganate; nevertheless, it would have been obvious to one of ordinary skill in the art to utilize potassium permanganate as the permanganate oxidizer used in Brusic Kaufman et al. as evidenced by Haggart et al. motivated by the fact that not only Brusic Kaufman et al. disclose that permanganates are utilized in their slurry as oxidizer, but also, motivated by the fact that Watts et al. clearly teach that potassium permanganate is a known industrial oxidizer used in CMP slurry utilized to polish copper layers (Watts et al., Abstract; column 1, lines 45-52).

### ***Response to Amendment***

Applicants' amendment to claims 31-36, pages 5-6, filed July 23, 2009 by amending the claims to not recite "use of a composition" is acknowledged. However, said amendment does not place the claim or the application in condition for allowance. Furthermore, the amendment presented for claims 31-36 as filed on July 23, 2009 introduced a new group of claims, method of forming a passivating layer on a substrate,

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to the claims; thus, instant claims 31-36 are withdrawn from further examination as detailed out above.

Nevertheless, the amendment has overcome the 101 rejection as presented in the previous Office action.

### ***Response to Arguments***

Applicants' arguments filed July 23, 2009 have been fully considered but they are not persuasive.

Applicants have argued that a high pH such as up to 9 and even 12 are not taught by Brusic Kaufman et al. Applicants have, further, argued that Brusic Kaufman et al. emphasizes that the most preferred pH of the second slurry is 4 to 7.5.

The Examiner, respectfully, submits that column 7, lines 15-18 disclose a pH of 2 to 12; a most preferred embodiment which is one embodiment of a reference does not reflect the teaching of a reference as a whole. It is to be noted that a reference should be considered for all it teaches and not only its most preferred embodiment or its examples which are another set of most preferred embodiments. Furthermore, column 7, lines 15-18 refers to the pH of the first slurry.

Applicants have argued that Brusic Kaufman et al. are completely silent with respect to avoiding copper complexing agent such as ammonium species.

It is, respectfully noted that as detailed out above, although the reference may point to the use of complexing agent, it is silent to the use of copper complexing agent. Thus, the reference is seen to read on the instant claims. Moreover, instant claim 1 recites "being devoid of a film-forming agent, a copper complexing agent and/or ammonium cations". Therefore, it is clear that if the reference is devoid of either of them, it would meet the limitation of instant claims; with that said, since Brusic Kaufman et al. clearly disclose that the use of film-forming agent is optional, this would read on the limitation of instant claims. This is specially true because once a component is optional, it does not have to be present in the composition.

With reference to Applicants' argument drawn to BTA (i.e. benzotriazole), it is to be noted that said compound is a known film-forming agent as also referred to in the reference and the reference clearly disclose that the present of such compounds is optional.

Applicants have argued that Brusic Kaufman et al. is completely silent to a limiting oxidation potential of their slurries. Nevertheless, it is to be noted that since the reference disclose a first slurry having a pH of from about 2.0 to about 12.0 which comprises an oxidizing agent such as hydrogen peroxide, or a permanganate, etc., an abrasive such as silica, alumina, or others in an amount of 0.5 to 15.0 wt% wherein said slurry forms a passivation layer on the substrate, characteristics of oxidation potential as recited in instant claims are expected to follow from the composition of the reference

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since it is substantially similar to what is claimed instantly absence specific and clear prove otherwise. This is specially true since a reduction in oxidation potential would slow down the polishing rate as is known in the art as depicted by Haggart et al.

Applicants have argued that Shimazu et al. teaches away from the instant invention, and said reference teaches the use of KOH.

The Examiner, respectfully, submits that Shimazu et al. was used for their teaching on the use of potassium carbonate in polishing compositions to adjust the pH as clearly stated in the previous Office action and detailed out above. Potassium carbonate (i.e.  $K_2CO_3$ ) clearly meets the limitation of instant claims 13-17 and 19-20 with reference to an anion selected from carbonate and a cation such as  $K^+$ . Furthermore, no indication was made to the use of KOH of Shimazu et al.; this is considering the fact that Shimazu et al. disclose the use of a number of compounds "such as"  $K_2CO_3$ .

With reference to Applicants' argument drawn to Parker et al., it is respectfully, submitted that Parker et al. was utilized for their teaching on the use of compounds such as potassium carbonate and cesium carbonate (i.e. Group I metal carbonates) to adjust the pH as clearly stated in the previous Office action and detailed out above. It is to be noted that as pointed out, potassium carbonate taught by Shimazu et al. drawn to polishing composition, has been known to be used as a pH adjuster, and the disclosure of both potassium carbonate and cesium carbonate for the purpose of adjusting pH by

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Parker et al. clearly suggests that they are functionally equivalent. Therefore, just because Parker et al. do not teach the other limitations of instant claims does not constitute that said reference can not be used in the rejection specially when Parker et al. is used in a combination of references. Moreover, in response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicants have argued that since Watts et al. disclose the use of copper-complexing agents, it can not be used for their teaching on the use of potassium permanganate as an oxidizer in polishing slurries.

The Examiner, respectfully, submits that Watts et al. was utilized for their teaching on the use of potassium permanganate as a known industrial oxidizer in polishing or CMP compositions as clearly stated; in fact, Brusic Kaufman et al. clearly provides the motivation to use potassium permanganate because said reference clearly teaches the use of permanganates, overall, as suitable oxidizers. Permanganates are quite known oxidizers in CMP and polishing compositions. Furthermore, in response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **PEGAH PARVINI** whose telephone number is (571)272-2639. The examiner can normally be reached on Monday to Friday 8:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on 571-272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Pegah Parvini/  
Examiner, Art Unit 1793

/Anthony J Green/  
Primary Examiner, Art Unit 1793